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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,561	05/19/2005	Brian A. Gregg	NREL 03-15	7494

7590
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04/03/2006

EXAMINER

DIAMOND, ALAN D

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 04/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/535,561	Applicant(s) GREGG	
	Examiner Alan Diamond	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05192005</u> . | 6) <input type="checkbox"/> Other: ____. |

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

The specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 602. In particular, the instant declaration states that "[t]his declaration is directed to the international application of which it forms a part" and that "I hereby state that I have reviewed and understand the contents of the above identified international application". However, the instant application is not an international application, i.e., it is in the national stage and, and the PCT serial number is never identified in the instant declaration.

Normally, the inventor's declaration has a statement such as "... the specification of which was filed on (fill in the date) as United States Application No. or PCT International Application Number (fill in the number) ... ". Additionally, the title of the invention is normally given in the declaration. An example of a typical declaration for utility application can be found in MPEP 602.

Priority

2. It appears that the provisional application for which priority is claimed, i.e., 60/503,335 filed September 16, 2003 is in error. Said 60/503,335 has nothing to do with the instant specification and claims and has no inventor in common with the instant application. Since the instant application is a 371 of PCT/US04/30201, which claims the benefit of 60/503,335, it appears that Applicant will have to correct the provisional application Serial No through the PCT branch since in order for the instant continuity to be corrected, the PCT continuity would also have to be corrected.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claims 9 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 is indefinite because the TiOPc and PPyEI have not been defined in the claim. It is suggested that the TiOPc and PPyEI be defined in the claim as it is defined in instant claim 25.

In claim 16, at line 1, the term "a n-type semiconductor" should be changed to "the n-type semiconductor" so as to particularly point out the semiconductor.

In claim 16, at line 4, the term "a p-type semiconductor" should be changed to "the p-type semiconductor" so as to particularly point out the semiconductor.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 4-6, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Cordaro (U.S. Patent Application Publication 2002/0157702). The instant claims are not supported by provisional Application 60/503,335, and thus have a filing date of 09/16/2004. Cordaro has a 102(b) publication date of 10/31/2002.

Cordaro prepares a solar cell comprising a p-type layer (24) comprising p-type pigment particles (40) mixed in a binder matrix (44) that can be an epoxy matrix; and, in contact with the p-type layer (24), there is an n-type layer (26) comprising n-type

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pigment particles (46) mixed in a binder matrix (50) that can be an epoxy matrix (see paragraphs 0031 to 0038; and Figure 2). The materials used for the n-type and p-type pigments are typically crystalline, and the diameters of the n-type and p-type pigments can be 0.1 micron, i.e., 100 nm (see paragraphs 0031 and 0035). The substrate (62) for the solar cell can be flexible with an electrically conductive coating (32) (see paragraph 0050; and Figure 6). Since Cordaro teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-7, 10-12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cordaro (U.S. Patent Application Publication 2002/0157702).

Cordaro prepares a solar cell comprising a p-type layer (24) comprising p-type pigment particles (40) mixed in a binder matrix (44) that can be an epoxy matrix; and, in contact with the p-type layer (24), there is an n-type layer (26) comprising n-type pigment particles (46) mixed in a binder matrix (50) that can be an epoxy matrix (see paragraphs 0031 to 0038; and Figure 2). The materials used for the n-type and p-type pigments are typically crystalline, and the diameters of the n-type and p-type pigments can be 0.1 micron, i.e., 100 nm (see paragraphs 0031 and 0035). The substrate (62) for the solar cell can be flexible with an electrically conductive coating (32). The p-type

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layer (24) can contain electrically conductive filler particles (42) (see paragraph 0031); and the n-type layer (26) can contain electrically conductive filler particles (48) (see paragraph 0035). The p-type layer (24) and the n-type layer (26) are not limited to any particular thickness (see paragraphs 0034 and 0038), and thus, the thickness of less than about 250 nm, as here claimed, would have been within the skill of an artisan. Cordaro teaches the limitations of the instant claims other than the difference which is discussed below.

Cordaro does not specifically teach that its conductive filler particles (42) and conductive filler particles (48) are anions and cations, respectively. However, as noted above, said filler particles (42) and (48) can be electrically conductive. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided said filler particles (42) and conductive filler particles (48) as anions and cations, respectively, so that a working solar cell could be prepared.

9. Claims 8, 9, 13, and 17-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cordaro as applied to claims 1-7, 10-12, and 14-16 above, and further in view of JP 2003-332600 (herein referred to as JP '600). The instant claims are not supported by provisional Application 60/503,335, and thus have a filing date of 09/16/2004. JP '600 has a 102(a) publication date of 11/21/2003.

Cordaro, as relied upon for the reasons recited above, teaches the limitations of instant claims 8, 9, 13, and 17-33, the difference being that Cordaro does not specifically teach that its n-type and p-type semiconductor particles are organic. However, organic n-type and p-type semiconductor particles are known in the art for

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use in solar cells, as shown by JP '600 (see the entire document). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used organic n-type and p-type semiconductor particles for the n-type and p-type semiconductor particles in Cordaro's solar cell because organic n-type and p-type semiconductor particles are known in the art for use in solar cells, as shown by JP '600.

10. Claims 8, 9, 13, 17-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cordaro as applied to claims 1-7, 10-12, and 14-16 above, and further in view of Bulovic et al (U.S. Patent 6,352,777).

Cordaro, as relied upon for the reasons recited above, teaches the limitations of instant claims 8, 13, 17-24, and 26-33, the difference being that Cordaro does not specifically teach that its n-type and p-type semiconductor particles are organic. However, the use of organic semiconductors is well known in the art as shown by Bulovic et al (see the entire document). In particular, in Bulovic et al's Table 1 bridging cols. 28 and 29, there are seen various n-type and p-type organic semiconductor pairs. Examples of the semiconductors in said Table 1 include TiOPc and PPEI. It is the Examiner's position that PPEI renders obvious the use of PPyEI. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used organic semiconductor materials for Cordaro's n-type and p-type semiconductor particles because n-type and p-type semiconductor materials are well known in the art, as shown by Bulovic et al.

Conclusion

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11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

WO 2005/029592 A1 is of the same family as the instant application, and shows a priority benefit claim to Serial No. 60/503,335.

Also made of record are the following articles:

Tsuzuki et al, "Photoelectrical conversion of p-n heterojunction devices using thin films of titanyl phthalocyanine and a perylene pigment," Thin Solid Films, Vol. 273, (1996), 177-180.

Gregg, "Bilayer molecular solar cells in spin-coated TiO₂ substrates," Chemical Physics Letters, Vol. 258, (1996), pages 376-370.

Brown et al, "Charge carrier generation and exciton quenching at M3EH-small molecule and M3EH-PPV/oxide interfaces," IEEE, (2000), pages 1186-1189.

Gregg, "Excitonic Solar Cells," J. Phys. Chem. B, (2003), Vol. 107, 4688-4698.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
March 30, 2006

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized flourish at the end.